

DESALINATION: *A DROP IN THE BUCKET?*



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Desalination Plants

- Florida 114
- California 33
- Texas 20
- 22 other states
- And now, also MA!

Mickley and Associates 2002

Annual Rainfall

- Florida >50"
- California <30"; about 1/2 <10"
- Texas <30"
- Mass. 45-50"
- Seattle 36"

Why desalination plants in Mass ?

U.S. Trends

| | <u>1993</u> | <u>2003</u> |
|---------------------|-------------|-------------|
| # Plants | 133 | 234 |
| States | 13 | 25 |
| % in FL | 61% | 30% |
| % > 6 MGD | 4% | 16% |

Mickley and Associates 2002

Global Statistics

- **Saudi Arabia: 70% of water from 30 desal plants producing 1 bgd**
- **Israel: 290 mgd 2005; 540 mgd 2020**
- **Ashkelon plant in Israel: 75 mgd (0.2 cents/gallon)**
- **Spain: largest in Europe = 32 mgd**

Methods of Desalination

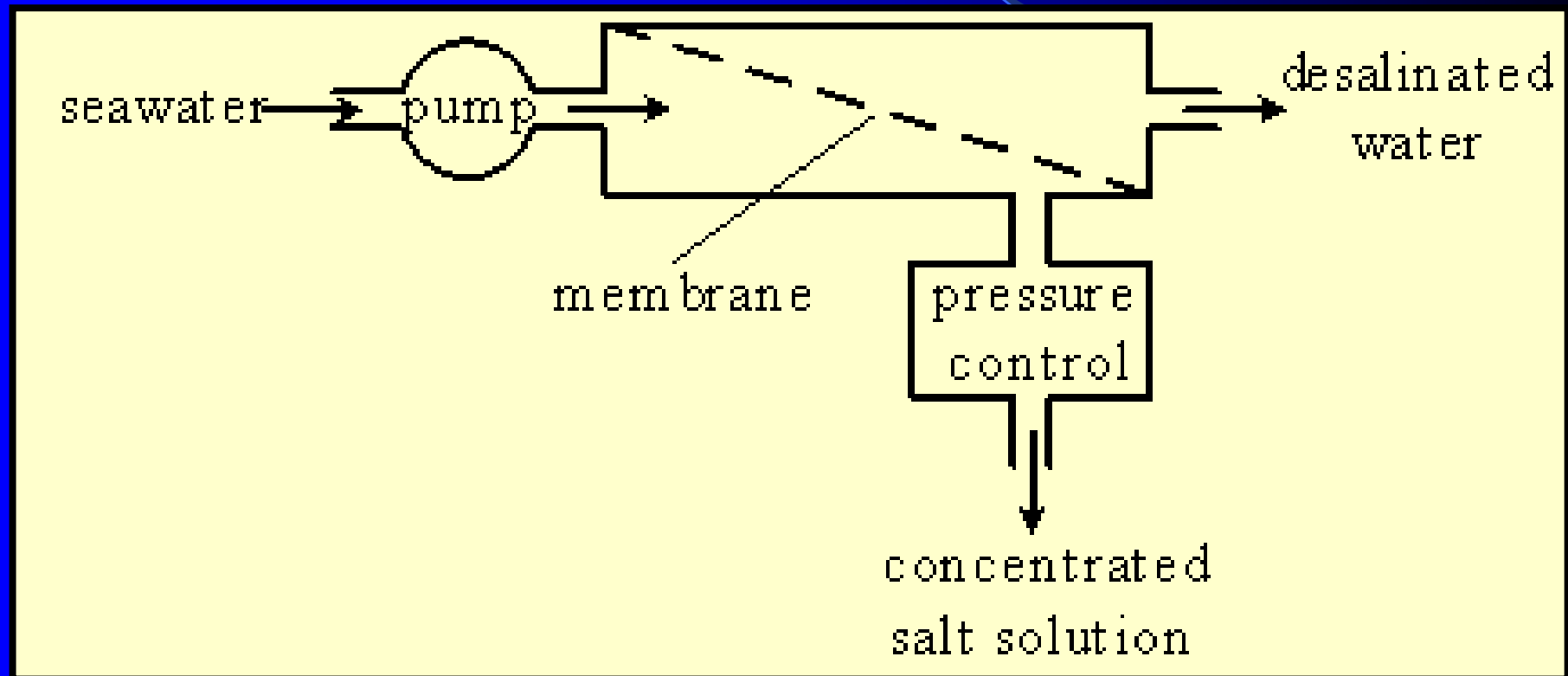
- **Multi-stage Flash: distillation**
- **High Pressure Membrane Filtration:
reverse osmosis**

Multistage Flash (Distillation)

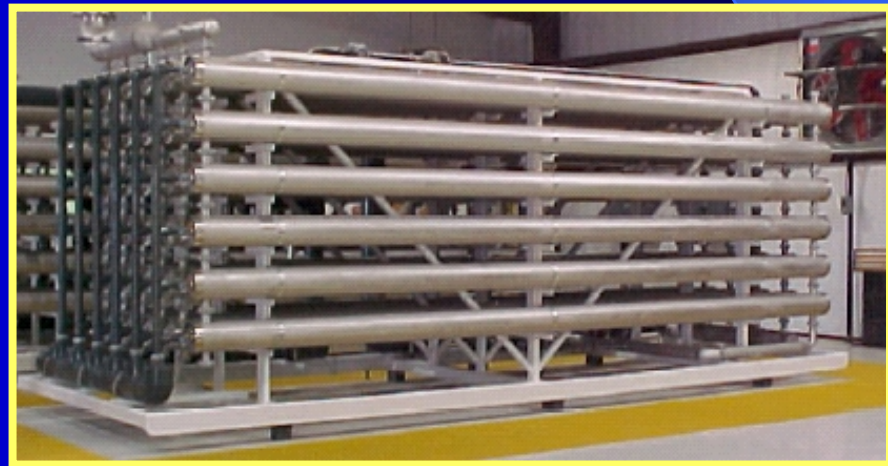


Cyprus

High Pressure Membrane Filtration (Reverse Osmosis)



Pressure vessel w/ RO membrane



Stacks of pressure vessels

Types of Withdrawals

- Brackish groundwater (1-10 ppt)
- Estuarine tidal river (0-35 ppt)
- Ocean (30-35 ppt)

Desalination Pros

- **Renewable & Predictable**
- **Diversification of supply**
- **Water supply independence for community**
- **No drawdown in upland streams or headwaters**

Why Desalination in MA?

- Renewable & Predictable ✓
- Diversification of supply ✓
- Water supply independence for community ✓
- No drawdown in upland streams or headwaters ?

Desalination Cons

- **Construction/siting impacts**
- **Entrainment and impingement**
- **Brine discharge toxicity**
- **Growth inducement**

Siting Impacts

- Loss of public access
- Noise & sound pollution
- Impacts to wetlands



Fish Impingement



End of pipe Entrainment and Impingement Control Device



SOURCE: RANNEY

Johnson Screens



Brine Discharge Toxicity

- May block anadromous fish migration
- Potential mortality to drifting plankton
- Potential mortality to benthic organisms
- * Very little information on brine toxicity

Brine Disposal Options (%)

| | |
|------------------|----|
| Surface Water | 41 |
| Sewer | 31 |
| Well Injection | 17 |
| Reuse | 4 |
| Land | 2 |
| Evaporation Pond | 2 |
| Other | 3 |

Mickley and Associates 2002

Growth Inducement



Needs for Desal in MA

- **Good baseline data**
- **Environmental impact controls**
- **Long-term monitoring**
- **Statewide policy**
- **Guidelines for proponents**

Desalination Strategies

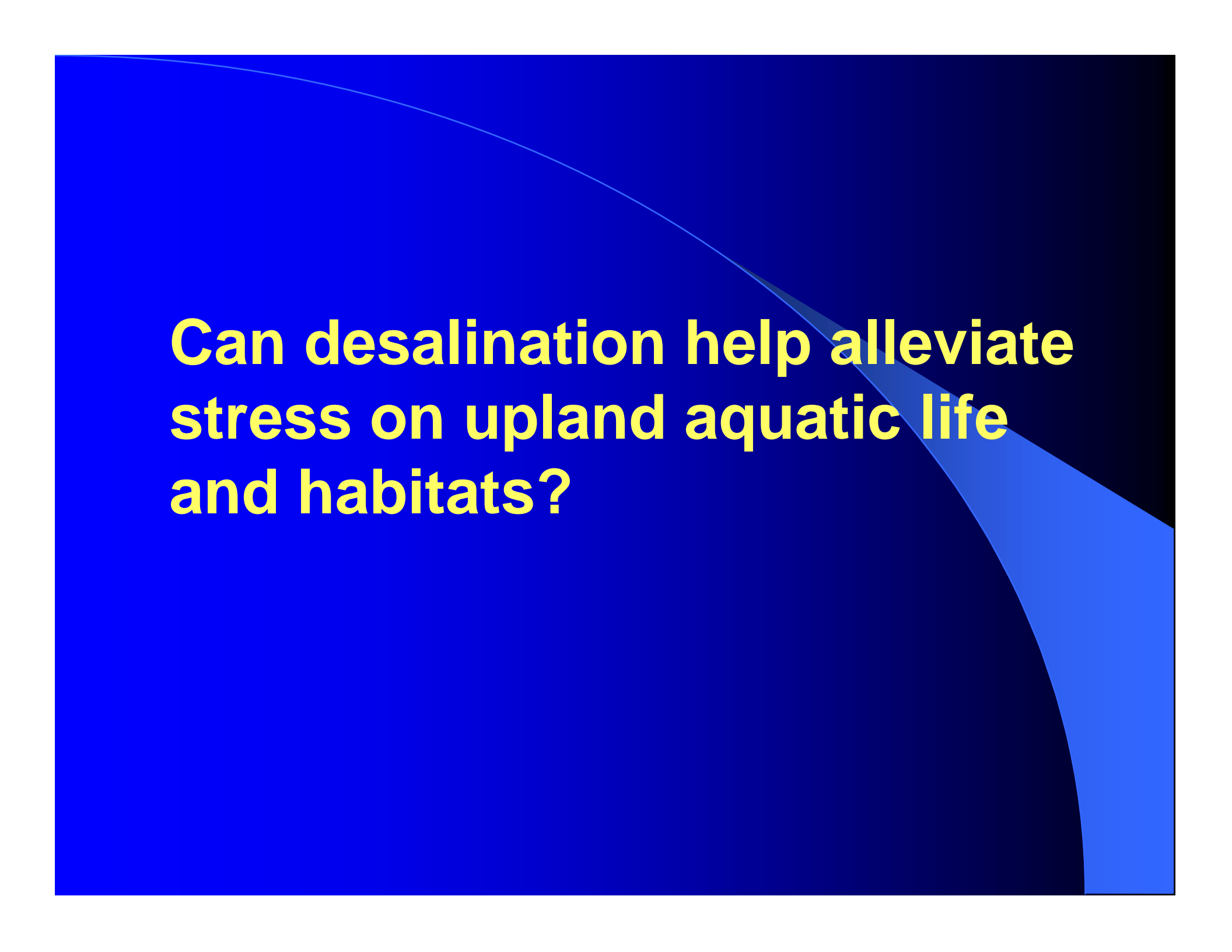
- Texas
- Virginia
- California
- N. Carolina

NOT Florida

NOT Massachusetts



Is desalination viable in MA?

The background is a solid blue color. A thin, light blue curved line starts from the top left and arcs towards the right. A darker blue triangular shape is positioned on the right side, pointing towards the center.

**Can desalination help alleviate
stress on upland aquatic life
and habitats?**

**Are the impacts associated
with desalination just a “drop
in the bucket?”**

